What is claimed is:

1. In a multiprocessor computer system having a plurality of processing nodes and physical communication links interconnecting the processing nodes in a predefined topology, wherein each processing node includes a processor, a router and memory, wherein the physical communication links connect a router in one processing node to a router in another processing, and wherein each router consults a routing table resident within the processing node when deciding where to route a message from one processing node to an adjacent processing node, a method of building a routing table, comprising:

a) determining all single hops for each processing node;

b) querying each adjacent node for its single hop routes;

c) determining if all nodes can be reached;

d) if all nodes cannot be reached, setting x=2;

e) querying each adjacent node for its "x" hop routes;

f) eliminating all routes to a particular node that are longer than existing routes from the node where the routing table will reside to that particular node;

g) eliminating all routes that introduce a cyclic dependency;

h) choosing a best route for e node;

i) determining if all nodes can now be reached;

j) if all nodes cannot be reached, setting x = x+1 and repeating e through j; and

k) if all nodes can be reached, building the routing table.

2. The method of claim 1, wherein querying each adjacent node for its "x" hop routes includes obtaining dependency information for each route.

3. The method of claim 1, wherein querying each adjacent node for its "x" hop routes includes obtaining dependency information for each route, wherein the dependency information is stored as a bit vector.

4. The method of claim 1, wherein choosing a best route for a node includes comparing routes to the node to a route obtained by applying a routing algorithm and selecting the route that is closest to the route obtained by applying the routing algorithm.

5. A multiprocessor computer system comprising:

a plurality of processing element nodes, each processing element node having a processor, a router and memory; and

physical communication links interconnecting the processing element nodes in a predefined topology, wherein the physical communication links connect a router in one processing element node to a router in another processing element node;

wherein each router includes:

a plurality of ports, wherein the ports receive and send messages; and a routing table associated with each port, wherein the routing table includes entries having directions for routing a message along a given route, wherein the directions for routing are determined by:

a) determining all single hops for each processing node;

b) querying each adjacent node for its single hop routes;

c) determining if all nodes can be reached;

d) if all nodes cannot be reached, setting x=2;

e) querying each adjacent node for its "x" hop routes;

f) eliminating all routes to a particular node that are longer than existing routes from the node where the routing table will reside to that particular node;

g) eliminating all routes that introduce a cyclic dependency;

h) choosing a best route for e node;

i) determining if all nodes can now be reached;

j) if all nodes cannot be reached, setting x = x+1 and repeating e through j; and

k) if all nodes can be reached, building the routing table.